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3 June 1970

AD-872084

Materiel Test Procedure 3-3-507

U. S. Army Armor and Engineer Board

U. S. ARMY TEST AND EVALUATION COMMAND
COMMON SERVICE TEST PROCEDURE

TRACKING AND HITTING PERFORMANCE
STATIONARY GUN MOUNT - MOVING TARGET

1. OBJECTIVE

The objective of this Materiel Test Procedure (MTP) is to outline procedures for determining the tracking and hitting performance of weapon systems from a stationary gun mount and the degree to which they satisfy the requirements of the Qualitative Materiel Requirements (QMR), and Small Development Requirements (SDR).

2. BACKGROUND

The final acceptability of a weapon system is largely governed by its ability to deliver effective fire rapidly and accurately on a target. The need for improving moving target hit capabilities has increased in direct proportion to the increase in battlefield mobility and the number of armored combat vehicles in modern armies. Incorporation of power gun controls, range-finders, stabilization system, ballistic computers and lead computers in the more sophisticated weapon systems has greatly increased the moving target hitting potential of both the primary and secondary armament of these vehicles.

3. REQUIRED EQUIPMENT

- a. Appropriate Moving Target Range Facilities.
- b. Appropriate Tactical Vehicles.
- c. Driving Area where Moving Target Range Conditions Can be Simulated with Tactical Vehicles.
- d. Appropriate Targets.
- e. Appropriate Standard Ammunition.
- f. Camera(s), Still, Motion or Video as available with necessary Film and Video Recorder when applicable.
- g. Pullover Gage or other equipment as required to measure gun and gun barrel wear.
- h. Meteorological Equipment as required for measuring:
 - 1) Wind speed and direction
 - 2) Ambient temperature
 - 3) Relative humidity
- i. Boresighting devices as required.
- j. Gridded Target for alignment.
- k. Ambulance with Medical Aid Personnel and Equipment.
- l. Forms for recording data.
- m. Qualified M1A1 Gunner's Quadrant
- n. Stop Watch
- o. Alternate sight if required.

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4. REFERENCES

- A. USAMC Regulation 385-12, Verification of Safety of Materiel from Development Through Testing, Production, and Supply to Disposition.
- B. USATECOM Regulation 385-6, Verification of Safety of Materiel During Testing.
- C. Applicable Range Regulations and Standing Operating Procedures.
- D. Pertinent technical publications .
- E. Qualitative Materiel Requirement (QMR), Small Development Requirements (SDR) or other appropriate document.
- F. FM 17-12, Tank Gunnery.
- G. MTP 2-3-500, Preoperational Inspection and Physical Characteristics.
- H. MTP 3-3-500, Preoperational Inspection and Physical Characteristics (Armament and Individual Weapons).
- I. MTP 3-3-501, Personnel Training.
- J. MTP 3-3-503, Boresight and Zero.
- K. MTP 3-3-505, Speed and Precision of Lay.

5. SCOPE

5.1 SUMMARY

This MTP describes the following:

a. Preparation for Test - A review of the Safety Release. A determination of the availability of service personnel and that test materiel is in satisfactory condition for testing and preparation of the rangesite and boresighting and zeroing the weapon system.

b. Nonfiring Exercises - A test to determine the tracking capability at varying ranges, target speeds and angles of target presentation:

- 1) Combat vehicles with direct fire artillery class main armament
- 2) Combat vehicles with automatic type main armament
- 3) Flexible mounted automatic weapons on combat vehicles

c. Firing Exercises - A test to determine the hitting capability and time required to hit targets moving at varying speeds and angles of target presentation with those weapon systems shown in paragraph b above.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Safety

The test officer shall ensure that; a Safety Release has been received from HQ USATECOM in accordance with reference 4B and is understood prior to commencing testing.

6.1.2 Personnel

a. Ensure the availability of service personnel, representative of those that will operate the test item in the field, who have been trained in accordance with the procedures of MTP 3-3-501 and are cognizant of:

- 1) Pertinent technical publications for the test items.
- 2) Applicable range regulation and standing operating procedures (reference 4C).
- 3) Objectives of the test.
- 4) Pertinent data required.
- 5) Method of obtaining observations.
- 6) Method of recording data.
- 7) Safety hazards.

b. All gunners should have completed the pertinent manipulation exercises outlined in MTP 3-3-505 and done some firing of the test weapon.

c. Record the following data:

- 1) Name, rank or grade, Military Occupational Specialty (MOS), training time and experience in MOS for all test personnel.
- 2) For each gunner; whether pertinent manipulation exercises in MTP 3-3-505 had been completed, and the type and approximate amount of prior firing with the test weapon.

6.1.3 Inspection

Subject the weapon system and vehicle on which it is mounted to the applicable inspections described in MTP 2-3-500 and MTP 3-3-500 recording all pertinent data on the test vehicle, test weapon system and the number of rounds, by type if applicable, previously fired through the gun and gun barrel.

6.1.4 Ammunition

The test officer shall ensure the availability of sufficient standard ammunition for each weapon to be tested and the following shall be recorded for each type of ammunition:

- a. Number of rounds recorded
- b. Lot number of rounds recorded

6.1.5 Pretest Operations

a. Arrange for the use of:

- 1) Moving target range facilities suitable for the weapon system

being tested.

- 2) Trucks or armored personnel carriers to be used as targets during nonfiring exercises.
- 3) Driving areas where tactical vehicles, with target as shown in Appendix A, can be used for nonfiring exercises.

NOTE: 1. Driving area must be level enough to allow tracking of target vehicles at the ranges specified for the weapon system over the following routes:

- a. Incoming crossing
- b. Outgoing crossing
- c. Incoming
- d. Outgoing
- e. Crossing
- f. Figure eight

2. The minimum length of courses to be traversed by the target vehicle and the range to the midpoint of that course should be as follows:

<u>Length (in meters)</u>	<u>Range (in meters)</u>
400	300
300	1,000
100	2,000

b. Prepare targets as shown in Appendix A for attachment to target vehicles.

c. Erect a boresight and zeroing target as described in MTP 3-3-503 at the required range for the weapon system.

d. Erect a gridded target as described in MTP 3-3-503 at a convenient range for checking boresight retention.

e. Place available meteorological equipment near firing site.

f. Position the vehicle at the firing point on level ground and set the brakes and measure vehicle cant and pitch with an M1A1 quadrant and record the values obtained.

g. Perform all prefiring checks as described in the appropriate technical manuals.

h. Boresight each weapon at the prescribed ranges as described in MTP 3-3-503. Record the equipment used, the range to the target, and the setting on each boresight knob or sight upon completion of boresighting.

i. Zero each weapon as described in MTP 3-3-503 using the primary round developed for the weapon and record the following data:

- 1) Date and time.
- 2) Nomenclature and serial number of the weapon and the vehicle weapon is mounted on.
- 3) Type target used.
- 4) Range to target.

- 5) Fire control equipment used.
- 6) Ammunition used by type and lot number and number of rounds fired.
- 7) Final boresight knobs and sight setting.
- 8) Distance of center of impact (CI) from aiming point.
- 9) Ambient temperature, relative humidity, wind speed and direction.

j. Aim the weapon system on the gridded target upon completion of boresighting and mark or record point of alinement for each optical sight and the gun barrel.

k. Attach targets described in (Appendix A) to selected vehicles.

l. Attach movie or video camera to weapon system on an adjustable mount so that camera can be alined on the same point as gunner's sight.

NOTE: If cameras are not available time on target will be measured by another crewman using an alternate sight and stop watch.

6.2 TEST CONDUCT

NOTE: Testing of each weapon system is divided into two phases, nonfiring and firing.

6.2.1 Nonfiring Exercises.

NOTE: Nonfiring exercises should be conducted, at a minimum, near the beginning, midway point and at the completion of testing.

6.2.1.1 Combat Vehicles with Direct Fire Artillery Class Main Armament

a. With the vehicle level and the weapon system and camera boresighted, at least three gunners will track target vehicles on courses described in the NOTE under paragraph 6.1.4a(3) with the main armament-coaxial machine gun and rigidly mounted cupola weapons using the following guidelines:

NOTE: 1. The term "rigidly mounted weapons" as used in this text denotes weapons installed in vehicles so as to provide precise gear or hydraulic type control by the gunner in traverse and elevation. The opposite would be a flexible or free mounted weapon either on a skate type ring mount or a pedestal mount where all movement is accomplished by manhandling. These latter types are covered in paragraph 6.2.1.3 below.

- 1) Operate the guns during daylight in the following modes, as applicable:
 - a) Power, unstabilized.
 - b) Stabilized with and without automatic lead computers, when applicable.
 - c) Manual.

- 2) Unless otherwise specified target vehicle speeds will be in 5 mile increments from 5 mph to 25 mph at ranges of 500 to 1,000 and 1,500 and 2,000 meters.
- 3) Target vehicles should be accelerated and decelerated and turned in evasive maneuvers as required to test the maximum capability of the man-system combination. The nonfiring exercises should always be conducted under more severe conditions than those allowed for the firing phase.
- 4) For weapon systems that do not have an automatic lead computer or when the automatic lead computer is not being used, the proper lead (in mils) computed on the basis of the target speed, range to target and velocity of ammunition should be given to the gunner and he should keep his sight alined on the target (Appendix A) accordingly. Normally this is only done when firing at a target moving on a perpendicular course to the firing vehicle.

b. Measure and record the total time required to each run (total possible time for the gunner to be on the target) using a stop watch.

c. Determine and record the time on target for each run by using one of the following methods and record the method used, (methods are listed in order of preference):

- 1) Photograph the target throughout each run and include the gunner's name or numerical designation and the run number on the film.
- 2) Measure the time on target with a stop watch while observing through one of the other optical sights or an externally mounted vane sight.
- 3) The gunner will estimate the fraction of the time he was on target.

d. Record the following for each tracking exercise conducted in step a:

- 1) Date and time.
- 2) Nomenclature and serial number of vehicle on which the weapon is mounted and total number of miles accumulated on the vehicle.
- 3) Type target vehicle used.
- 4) Description and length of course.
- 5) Weapon control system mode.
- 6) Nomenclature of sight used.
- 7) Gunner's name.
- 8) Speed of target vehicle.
- 9) Description of evasive action, if any, taken by target vehicle.
- 10) Weather conditions.

e. On those vehicles with turret controls for the vehicle commander, repeat the exercise described in paragraph a with the commander manipulating

controls for main armament and/or coaxial machine gun and record data of steps b through d.

f. Repeat steps a through d above with the vehicle canted up to 15 degrees left and right.

g. Repeat steps a through e above using night vision devices and atmospheric light conditions, and each mode of lighting provided by the on vehicle searchlight.

h. Repeat steps a through d above for those vehicles providing the gunner with a secondary sight, using this sight.

6.2.1.2 Combat Vehicles with Automatic Type Main Armament

Conduct nonfiring exercises as described in paragraph 6.2.1.1.

6.2.1.3 Flexible Mounted Automatic Weapons on Combat Vehicles

a. At least three crewmen will track target vehicles on moving target course described in NOTE 1 and 2 under paragraph 6.1.4a(3) with the flexible mounted weapon during daylight and his estimated time on target (i.e., one half of tracking time) recorded.

NOTE: It is doubtful if resources such as camera or an alternate sight will be available for measuring the time on target for these weapons. However, it is a necessary prefiring training exercise and must be conducted.

b. Record the following data:

- 1) Date and time
- 2) Nomenclature of the weapon and the weapon mount, and the nomenclature and serial number of the vehicle on which the weapon is mounted and the total test miles accumulated on the vehicle.
- 3) Type of target vehicle used.
- 4) Description and length of course.
- 5) Name of gunner.
- 6) Speed of target.
- 7) Total tracking time.

6.2.2 Firing Exercises

- NOTE:
1. Check boresight alinement by relaying on the gridded target periodically throughout testing.
 2. All gun barrels will be within the prescribed wear limits.
 3. Moving target firing tests should be conducted, as a minimum near the beginning, midway point and end of testing.

6.2.2.1 Combat Vehicles with Direct Fire Artillery Class Main Armament

a. With the vehicle level and the weapon system boresighted and zeroed as described in MTP 3-3-503 or other appropriate criteria at least

three gunners will fire against moving targets with the main armament (conventional ammunition and missiles, when applicable)/coaxial machine gun and rigidly mounted cupola machine gun as follows:

- 1) Operate the guns, during daylight, in the following modes, as applicable:
 - a) Power (unstabilized)
 - b) Stabilized and using automatic lead computer
 - c) Stabilized without using automatic lead computer
 - d) Manual

NOTE: 1. The size of targets, target speeds and range to targets should be as specified in the QMR or other appropriate criteria insofar as is practicable. At some installations, moving target facilities are not capable of utilizing targets larger than a 6 ft x 6 ft (1.8 x 1.8 meter) panel, which has for many years been the accepted size target to represent all types of moving vehicles. However, where facilities permit realism in target presentation such as shown by the example in Appendix B should be accomplished.

2. Target courses should duplicate those described in NOTE 1 and 2 under paragraph 6.1.4a(3) to the extent that is practicable.

- 2) Starting with the turret oriented 30° (522mils) away from the moving target track as designated by the extreme limiting range marker begin each "run" as the target passes this limiting marker with the crew attempting to obtain a hit in the shortest possible time.

NOTE: Each "run" should be conducted as a tactical exercise with the vehicle commander designating the target as described in FM 17-12 (reference 4K) and either acquiring it or assisting the gunner as the weapon system permits and ranging, when appropriate.

- 3) When possible each firing run should be photographed with the movie or video camera as was done in the nonfiring exercises, otherwise timing should be done with stop watches.

b. Record the following for each moving target exercise conducted in step a:

- 1) Date and time.
- 2) Location.
- 3) Nomenclature and serial number of vehicle on which weapon system is mounted.
- 4) Total test miles accumulated on vehicle.
- 5) Type target used.

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- 6) Description and length of course.
- 7) Nomenclature and serial number of weapon being used.
- 8) Number of previous rounds fired (by type) through barrel and weapon.
- 9) Gunner's name.
- 10) Method used to acquire target within gunner's field of view.
- 11) Speed of target.
- 12) Time to acquire target and fire first round or missile.
- 13) Initial range setting used and how determined.
- 14) How lead was determined, i.e., estimated or by use of automatic lead computer.
- 15) Gunner's sensing.
- 16) Target hit or miss (as determined by observers or photography).
- 17) Time to fire second or subsequent round or missile, sensings, and whether hits or misses.
- 18) Nomenclature and lot number of rounds fired and nomenclature and serial number of missiles fired.
- 19) Total rounds of missile fired.
- 20) Total time target was in view.
- 21) Ambient temperature, relative humidity and wind speed and direction.
- 22) For each coaxial or cupola mounted machine gun moving target exercise:
 - a) Whether ammunition was all the same type or specified combat mix.
 - b) Size of bursts.

c. On those vehicles with main armament and turret controls for the vehicle commander, repeat steps a and b above.

d. Conduct selected limited testing described in step a above with the vehicle canted up to 15 degrees left and right and record the data of step b.

e. On those vehicles providing a secondary sight for the gunner conduct selected limited testing described in step a and b above using this sight.

f. Repeat testing described in steps a and b above using night vision devices and each mode of lighting provided by the on-vehicle searchlight or other artificial light sources prescribed by the QMR or other appropriate criteria and record night vision device and light source used, and atmospheric light conditions.

6.2.2.2 Combat Vehicles with Automatic Type Main Armament

a. With the vehicle level and the weapon system boresighted and zeroed as described in MTP 3-3-503 or other appropriate criteria at least three gunners will fire the main armament and coaxial machine gun as follows:

- 1) Operate the gun, during daylight, in the following modes, as applicable:
 - a) Power

- b) Stabilized
- c) Manual

NOTE: 1. The size of targets, target speeds and range to targets should be as specified in the QMR or other appropriate criteria.

2. Target courses should duplicate the nonfiring courses described in NOTE 1 and 2 under paragraph 6.1.4a(3) to the extent that is practicable with existing facilities.

- 2) Starting with the weapon system aligned with the extreme range fan limit marker, the gunner will commence tracking as soon as the target is totally within the range fan limit and attempt to hit the target with a prescribed burst in the shortest possible time. Time for the exercise will begin with the first movement of the weapon.

NOTE: 1. Depending upon the system tested and the ammunition being used, firing may be by either the slow or full automatic rate of fire or a combination of the two.

2. Normally the range to the target will be estimated and confirmed or adjusted as required by firing a single shot and followed by a prescribed burst.

- 3) When possible each firing run should be photographed with the movie or video camera as was done in the nonfiring exercises.

b. Record the following for each moving target exercise conducted in step a:

- 1) Data required in paragraph 6.2.2.1.a
- 2) Method of obtaining range to target
- 3) Mode of fire
- 4) Size of bursts

c. Conduct selected limited firing using procedures of step a with the vehicle canted up to 15 degrees left and right and record data of step b.

d. On vehicles where a secondary sight is provided repeat steps a and b using this sight.

e. Repeat steps a through c above using night vision device and under artificial light conditions as indicated in the QMR or other appropriate criteria and record device and light source used and atmospheric conditions encountered.

6.2.2.3 Flexible Mounted Automatic Weapons

a. With the vehicle level at least three personnel will fire the weapon at moving targets as follows:

- NOTE:
1. The size of targets, target speeds and range to targets should be as specified in the QMR, other appropriate criteria or as used for similar weapons mounted coaxially or in a cupola.
 2. Target courses should be the same as used for similar weapons mounted coaxially or in a cupola.
- 1) Starting with the weapon aligned on the extreme range fan limit marker, the gunner will commence tracking as soon as the target is completely within the range fan limit and attempt to hit the target with a prescribed burst in the shortest possible time.
 - 2) Time for the exercise will begin with the first movement of the weapon.

b. Record the following for each exercise of step a:

- 1) Data required for paragraph 6.2.1.3.b.
- 2) Mode of fire (slow or full automatic)
- 3) Size of bursts
- 4) Ammunition type and lot number
- 5) Whether ammunition was of one type of specified combat mix
- 6) Number of hits obtained

c. Conduct selected limited firing, using the procedures of step a, with the vehicle canted up to 15 degrees left and right and record the data of step b.

6.3 TEST DATA

6.3.1 Preparation for Test

6.3.1.1 Personnel

a. Record the following for all test personnel:

- 1) Name
- 2) Rank or grade
- 3) Military Occupational Specialty (MOS)
- 4) Training time in MOS
- 5) Experience in MOS

b. Record the following for each gunner:

- 1) Whether pertinent manipulation exercise in MTP 3-3-505 had been completed.
- 2) The type and approximate amount of prior firing with the test weapon.

6.3.1.2 Inspection

Record the following:

a. Vehicle inspection data collected as described in the applicable sections of MTP 2-3-500. (Record data on commodity maintenance evaluation data sheet).

b. Weapon system inspection data for each weapon, collected as described in the applicable sections of MTP 3-3-500. (Record data on commodity maintenance evaluation data sheet).

c. Number of rounds fired; for each weapon, when applicable:

- 1) Through the gun
- 2) Through the gun barrel

6.3.1.3 Ammunition

Record the following for each type ammunition recorded:

- a. Type of ammunition
- b. Lot number
- c. Number of rounds recorded

6.3.1.4 Pretest Operations

Record the following:

- a. Pitch and cant of test vehicle, in degrees
- b. For boresighting:

- 1) Equipment used
- 2) Range to each target in meters
- 3) Setting on each boresight knob or sight

c. For zeroing:

- 1) Date and time in minutes, hour, day, month and year.
- 2) Nomenclature and serial number of weapon.
- 3) Nomenclature and serial number of vehicle weapon was mounted on.
- 4) Setting on each boresight knob or sight.
- 5) Range to target in meters.
- 6) Type target used.
- 7) Fire control equipment used.
- 8) For ammunition used:
 - a) Type
 - b) Lot number
 - c) Number of rounds used
- 9) Distance of CI from the aiming point.
- 10) Ambient temperature in °F.
- 11) Relative humidity in %.
- 12) Windspeed and direction in mph and degrees, respectively.
- 13) Point of alignment of the following on the gridded target:

- a) Each optical sight
- b) Gun barrel

6.3.2 Test Conduct - Nonfiring Exercises

6.3.2.1 Combat Vehicles with Direct Fire Artillery Class Main Armament

a. Record the following for each tracking exercise conducted during daylight:

- 1) Date and time.
- 2) Nomenclature and serial number of vehicles on which weapon system is mounted.
- 3) Total test miles accumulated on vehicle.
- 4) Type target vehicle used.
- 5) Description and length (in meters) of course.
- 6) Weapon control system mode (power, stabilized, manual).
- 7) Nomenclature of sight used.
- 8) Test vehicle cant in degrees (0°, +15°, -5° etc).
- 9) Designation of person doing tracking, i.e., gunner or vehicle commander and their name.
- 10) Method used for determining "time on target".
- 11) Speed of target vehicle in mph.
- 12) Description of evasive action, if any, taken by target vehicle.
- 13) Time target was tracked to tenth of minute.
- 14) Time sight was properly aligned on target to tenth of minute.
- 15) Description of weather conditions.

b. Record data as described in step a above and the following for each tracking exercise conducted during darkness:

- 1) Description of atmospheric light conditions (cloudy, overcast, foggy, starlight, moonlight, etc.).
- 2) Type of light source.

c. Retain all movie film and photographs taken.

6.3.2.2 Combat Vehicles with Automatic Type Main Armament

Record data as described in paragraph 6.3.2.1 above.

6.3.2.3 Flexible Mounted Automatic Weapons on Combat Vehicles

Record the following:

- a. Date and time
- b. Nomenclature of weapon
- c. Nomenclature of weapon mount
- d. Nomenclature and serial number of vehicle on which weapon is mounted.

- e. Total test miles accumulated on vehicle.
- f. Type target vehicle used.
- g. Description and length (in meters) of course.
- h. Name of gunner.
- i. Speed of target in mph.
- j. Total tracking time in minutes and tenths of minutes.
- k. Gunner's estimate of the percent of time sight was alined on target.

6.3.3 Test Conduct - Firing Exercises

6.3.3.1 Combat Vehicles with Direct Fire Artillery Class Main Armament

a. Record the following for each moving target firing exercise with main armament during daylight:

- 1) Date and time.
- 2) Location.
- 3) Nomenclature and serial number of vehicle on which weapon system is mounted.
- 4) Attitude of vehicle, cant, in degrees (0° , $+10^{\circ}$, -15° , etc).
- 5) Total test miles accumulated on vehicle.
- 6) Type target used.
- 7) Description and length (in meters) of course.
- 8) Nomenclature and serial number of weapon being used.
- 9) Number of previous rounds fired (by type) through barrel and weapon.
- 10) Name and position of person tracking and firing, i.e., gunner or vehicle commander.
- 11) Method used to acquire target within gunner's field of view.
- 12) Nomenclature of sight used.
- 13) Weapon system control mode (power, stabilized with automatic lead computer, etc).
- 14) Speed of target in mph.
- 15) Time to acquire target and fire first round or missile in minutes.
- 16) Initial range setting used in meters and how determined.
- 17) How lead was determined, i.e., estimated or by use of automatic lead computer.
- 18) Gunner's and, when applicable, commander's sensing.
- 19) Targer hit or miss (as determined by observers or photography).
- 20) Time to fire second or subsequent round or missile, sensings, and whether hits or misses.
- 21) Nomenclature and lot number of rounds fired and nomenclature and serial number of missiles fired.
- 22) Total rounds or missiles fired.
- 23) Total time target was in view in minutes and tenths of minutes.
- 24) Ambient temperature in degrees Fahrenheit.
- 25) Relative humidity in percent.
- 26) Wind speed and direction in mph and degrees.

b. Record data as described in step a above and the following for each main armament moving target firing exercise conducted during darkness:

- 1) Description of atmospheric light conditions (cloudy, overcast, foggy, starlight, moonlight, etc.).
- 2) Type of light source used.

c. Record applicable data described in step a above and the following for each coaxial or cupola mounted machine gun moving target firing exercise conducted:

- 1) Whether ammunition was all of the same type or specified combat mix.
- 2) Size of bursts.

d. Retain all movie film and photographs taken.

6.3.3.2 Combat Vehicles with Automatic Type Main Armament

a. Record data as described in paragraph 6.3.3.1a above and the following for each moving target firing exercise conducted during daylight:

- 1) Method of determining range to target
- 2) Mode of fire (slow or full automatic)
- 3) Size of bursts

b. Record data as described in step a above and the following for each moving target firing exercise conducted during darkness:

- 1) Description of atmospheric light conditions (cloudy, overcast, foggy, starlight, moonlight, etc.).
- 2) Type of night sight and/or light source used.

c. Retain all movie film taken.

6.3.3.3 Flexible Mounted Automatic Weapons on Combat Vehicles

Record data as described in paragraph 6.3.2.3 and the following for each moving target firing exercise conducted:

- a. Mode of fire (slow or full automatic)
- b. Size of bursts
- c. Ammunition type and lot number
- d. Whether ammunition was of one type or specified combat mix
- e. Number of hits obtained

6.4 DATA REDUCTION AND PRESENTATION

Data in paragraph 6.3 will be consolidated as described below and presented in tabular or graph form so as to indicate whether the test item(s)

meet the applicable criteria.

6.4.1 Nonfiring Exercises

Compute the percentage of time on target for each run by reviewing the film frame by frame or taking the time on target recorded with the stop watch and dividing by the total possible time on target.

Compute the average of the percentage of time-on-target for each gunner in each mode of operation for each sight and each target speed and tracking course under daylight and night conditions at the beginning, midpoint and end of testing. Total the averages for all gunners for each condition and compute the grand average for each condition.

6.4.2 Firing Exercises

6.4.2.1 Artillery Class Armament

Compute the number of target hits and misses and the time required for each gunner in each mode of operation for each sight and each target speed and course under daylight and night conditions at the beginning, midpoint and end of testing. Total the averages for all gunners under each condition and compute the grand average in percentage of hits obtained under each condition.

6.4.2.2 Automatic Weapons

Compute the number of targets hit, size of bursts, rounds fired and hits obtained and number of targets missed and the time required for each gunner in each mode of operation for each target speed and course under daylight and night conditions at the beginning, midpoint and end of testing. Total the averages for all gunners under each condition and compute the grand average of percentage of targets hit under each condition and the percentage of rounds fired which hit the target.

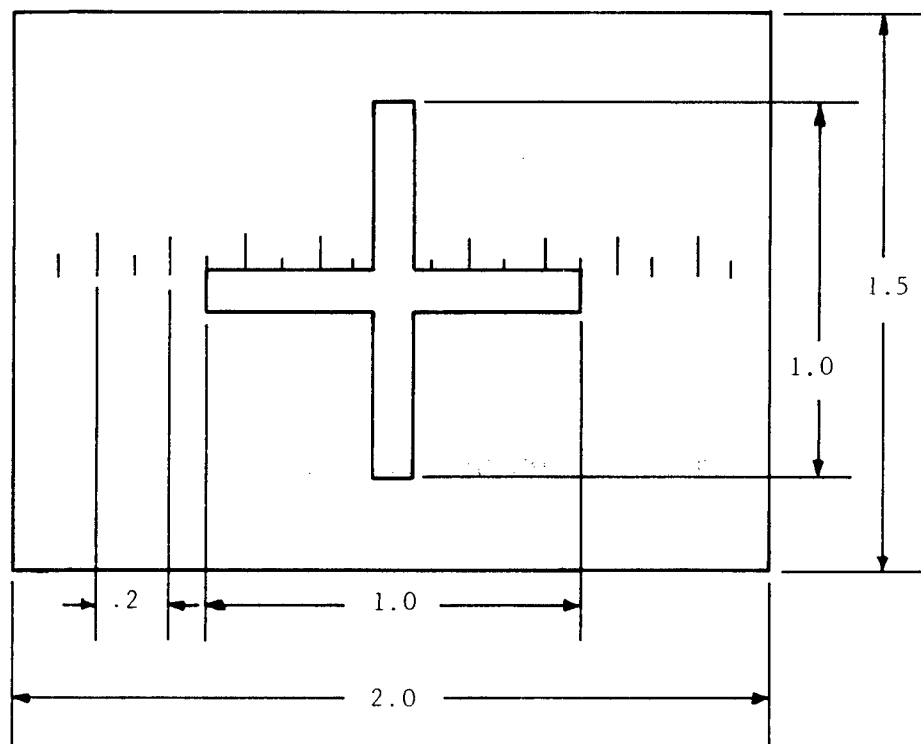
6.4.2.3 Effects of Wear

a. Compare results of tracking and firing exercises conducted at the beginning, midpoint and end of testing to determine the effect, if any, which vehicle operation had on these capabilities.

b. Compare the results of firings conducted at various stages of barrel wear to determine the effects such wear may have on dispersion and hit capabilities.

APPENDIX A

SAMPLE TRACKING AND LEAD OBSERVATION TARGET



(all dimensions in meters)

Explanatory Notes:

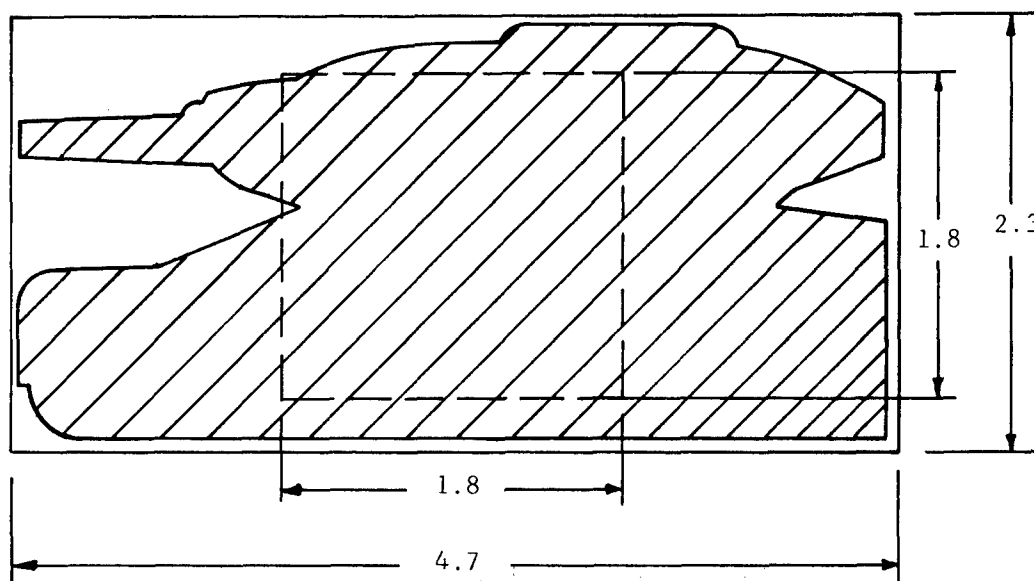
Target of plyboard construction with pattern painted using a combination of USAF yellow and black.

Attack to truck or armored personnel carrier as target bearing vehicle.

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APPENDIX B
SAMPLE MOVING TANK TARGET



(all dimensions in meters)

Explanatory Notes:

Target concept assuming the basic 6-ft x 6-ft (1.8m x 1.8m) superstructure of existing facility can be extended to provide target of larger overall dimensions shown.

Brace and frame structure for the extension to be lightest possible suitable for support of screen wire mesh cover and attached tactical silhouette cut from OD target cloth.

Gunner may note outline of the target frame but aims at the tank silhouette centered on the target face.

If the larger target cannot be used then the entire 6-ft x 6-ft (1.8m x 1.8m) target area will be covered with OD target cloth and the gunner's aim modified accordingly.

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